

BROOKHAVEN NATIONAL LABORATORY NATIONAL SYNCHROTRON LIGHT SOURCE

MEMORANDUM

DATE: 12 June 2000

TO: Sam Krinsky, Michael Hart, Richard Osgood, Peter Paul

CC: NSLS Management Group, FEL Project Team

FROM: William S. Graves, Richard Heese, Erik D. Johnson

SUBJECT: DUV-FEL Project Report; Period ended 9 June 2000

Work in Progress:

The drop-out problem on RF system A has yet to be conclusively determined. The klystron tank oil was discolored, so it was pumped out, the components wiped down and the connections checked (all were tight). Fresh oil was used to refill the tank and we resumed running late last week with drop-outs that were quite similar in character. We will continue watching the klystron carefully when we run to see if we can determine the nature of the problem and the required correction(s). It is notable that the beam energy was somewhat higher than previously achieved so some the clean oil seems to have improved the efficiency of the system.

The (optical) beam alignment studies proved interesting as well. Some ambiguities about the directions of screen motions were resolved and it was learned that pop-in 10 (the monitor down stream of accelerating section 4) was not moving fully into or out of the beam. There are also some occlusions of the beam at the edges of the screens of monitors 11 and 13. When we resume running the trajectories and images from the monitors will be evaluated with these potential problems in mind. The most important result however is that calibrations for a straight line reference all the way through the linac (up to monitor 13) have been established.

The software for independent control of the RF phases for the equipment is essentially complete with some fine tuning required this week. The on-line MATLAB analysis tools for image analysis have also been completed in their basic form. They will no doubt continue to evolve as they are used.

Work Planned for Next Week:

We will complete connection of the CCD camera trigger cables early in the week so we can perform quantitative analysis of the monitor images. We will also be shaking out the new software and continue with the studies of the photo-injector. In particular we will try to understand why our gun solenoid needs to run at substantially higher current than the essentially identical ATF system to obtain a well focused beam. We will also be making more refined measurements of the beam properties including current and emittance.

Management:

It has been decided to delay the COUR installation. We want to have the current machine more fully characterized, and the preparations for installation more advanced before committing to installation. The current target for installation is the week of July 10th. We will also use the running time between now and then to determine our course of action on the RF system A problems. If a tube replacement is required,

the down time imposed by COUR installation would be the best opportunity to make changes with the least overall impact on the schedule.